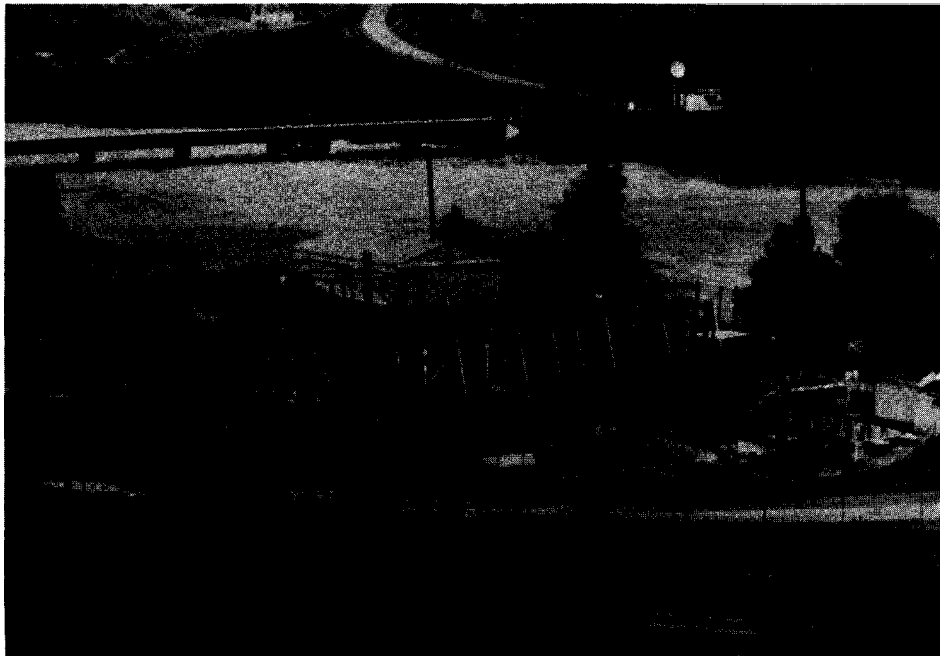




**Idaho
Power**

ANNUAL REPORT OXBOW HATCHERY

1985 Steelhead Brood Year



By

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ABSTRACT

During the 1985 brood year, 1,343 A-run steelhead adults were trapped and held at Oxbow Hatchery. Seven hundred females were spawned to obtain 2,974,362 green eggs. An eye-up percentage of 82.7 resulted in 2,458,870 eyed eggs, of which 1,582,269 were shipped to Niagara Springs Hatchery, 404,950 to Hagerman National Hatchery, 267,602 were kept at Oxbow, and 204,049 died in transit. The eggs kept at Oxbow produced 140,736 fry, weighing 75.3 pounds when planted in the Little Salmon River drainage.

Spring chinook salmon trapping captured 760 fish (699 adults and 61 jacks), and 733 of these (673 adults and 60 jacks) were transferred to Rapid River Hatchery.

Major cleanup and repair work was continued to bring the hatchery back after several years of neglect.

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OBJECTIVES

The objectives of the Oxbow Hatchery are:

1. Trap adult steelhead trout and spring chinook salmon returning to the Hells Canyon Dam facility.
2. Hold adult steelhead until sexual maturity.
3. Spawn steelhead and incubate the eggs to the eyed stage for transfer to other production hatcheries.
4. Rear available excess steelhead eggs to the fry stage for release.
5. Assist in the transfer of adult chinook salmon to the Rapid River Hatchery.
6. Assist with the release of steelhead and chinook smolts into the Snake River below Hells Canyon Dam.

INTRODUCTION

Oxbow Hatchery is a steelhead trout and spring chinook salmon mitigation hatchery owned and funded by Idaho Power Company (IPC) and operated by the Idaho Department of Fish and Game (IDFG). The hatchery is located 602 river miles from the Pacific Ocean, at river mile 270 on the Snake River near Oxbow, Oregon. Adult fish are trapped at IPC's Hells Canyon Dam facility, approximately 23 miles downriver from the hatchery.

The primary objective of Oxbow Hatchery is to trap sufficient numbers of returning adult steelhead trout (Salmo gairdneri) and spring chinook salmon (Oncorhynchus tshawytscha) to meet the Hells Canyon portion of anadromous fish mitigation requirements for the upper Snake River.

Steelhead are trapped in Hells Canyon from mid-September through early December and again from early March through April. All steelhead used for mitigation requirements are held at Oxbow Hatchery for spawning in late March and April. Eggs are incubated on site to the eyed stage of development, then shipped to Niagara Springs Hatchery near Wendell, Idaho. The fish are hatched and reared to smolt, then trucked back for release into the Snake River below Hells Canyon Dam.

Spring chinook salmon are trapped from early May to mid-July. Salmon are held at Oxbow Hatchery for only a brief period before being transported to Rapid River Hatchery. High water temperatures during summer months do not permit long-term holding of salmonids at Oxbow Hatchery (Fig. 1). Chinook are spawned and reared at Rapid River for approximately 18 months and then returned to the Snake River below Hells Canyon Dam as smolts.

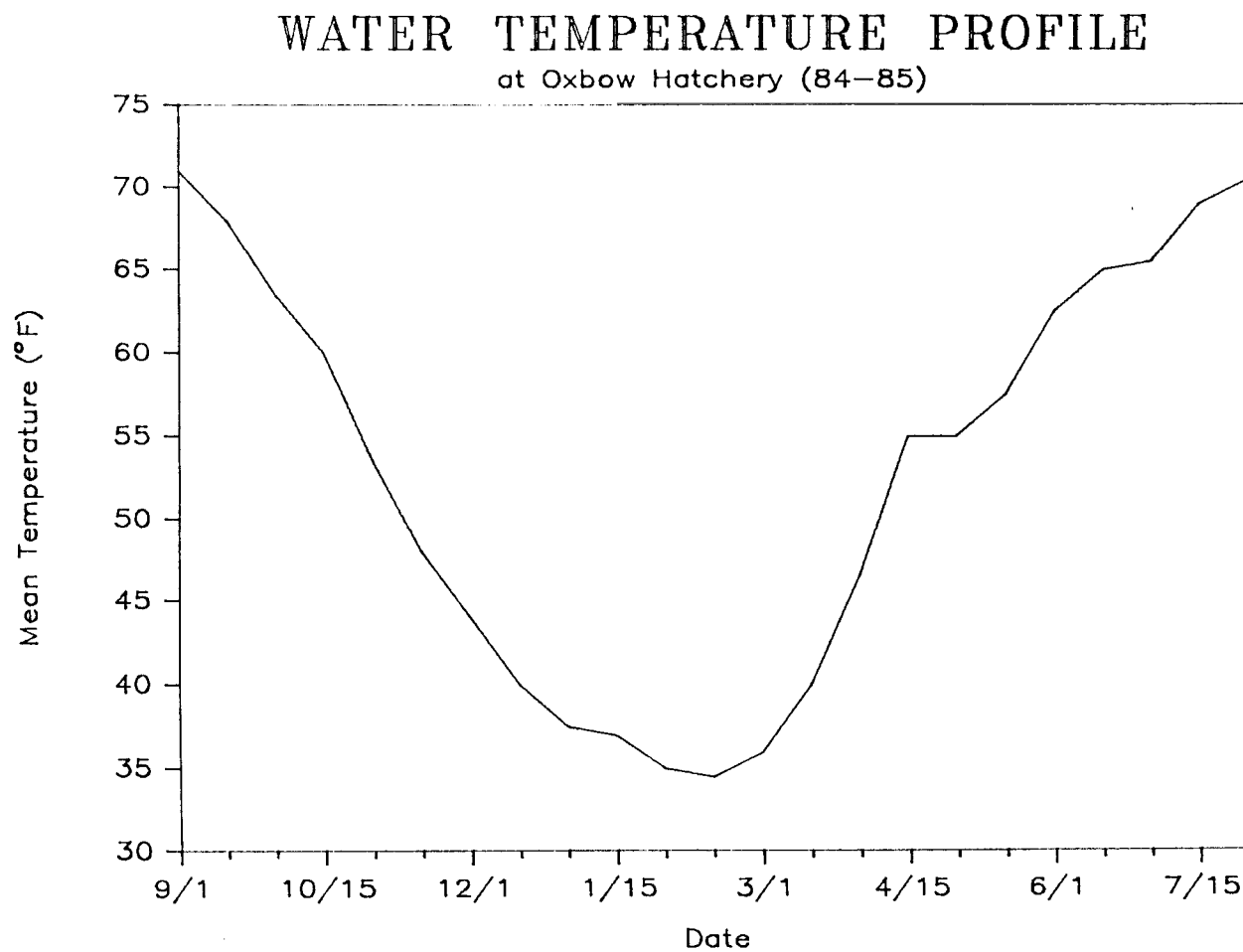


Figure 1. Water temperature profile at Oxbow Hatchery, recorded at 15-day intervals, September 1984 through August 1985.

The Oxbow Hatchery facility includes four concrete adult holding ponds equipped with power-assisted crowders, fish loading equipment, and sorting tanks. Two ponds are 34 ft. x 104 ft. x 8 ft. and two are 34 ft. x 54 ft. x 8 ft. Normal operating water depth in these ponds is four feet. There are six 3 ft. x 6 ft. x 100 ft. production raceways with cinder-block walls and a 360 ft., U-shaped gravel spawning channel. Incubating facilities consist of 12 stacks of Heath incubators with 14 operational trays per stack and room for 16 more stacks.

Water is supplied to the hatchery directly from the Snake River by four electric pumps. Two large pumps supply a maximum of 12 cfs per pump to the holding ponds and raceways. The other two pumps are smaller and supply the incubation system. Only one pump from each pair is used during normal operation. The other is a standby and is serviced by a different electric power source.

ADULT TRAPPING

Steelhead Trapping

No run report for the 1985 steelhead brood year was submitted, so all pertinent data available will be included in this report.

Adult steelhead trout trapping at Hells Canyon for the 1985 brood year began on September 4, 1984. Fish were trapped 43 days until December 7, yielding 947 steelhead. The trap was started again on March 6, 1985 and fished 35 days until April 10, yielding 406 steelhead. A total of 78 days trapping yielded 1,343 A-run steelhead with an average of 17.2 fish trapped per day (Table 1). All of these fish were kept at the Oxbow Hatchery to meet the mitigation requirements of the Hells Canyon FERC permit. An additional 40 steelhead, including 16 kelts, were captured during chinook salmon trapping in May. None of these fish were used for spawning. They were released into Hells Canyon Reservoir.

A 90-fish subsample of the total run showed 80% (72) to be one-ocean fish and 20% (18) to be two-ocean (length >27 in.). Fish counts during spawning showed a sex ratio of 64.2% females to 35.8% males.

Chinook Trapping and Transfers

Hells Canyon spring chinook salmon trapping began on May 7, 1985 and ran continuously for 57 days, until July 2. A total of 699 adults and 61 Jacks were trapped for a daily average of 12.3 adults and 1.1 Jacks. For a summary of all data collected from fish in this run, see the 1985 Hells Canyon Spring Chinook Trapping and Disposition report.

Table 1. Steelhead adults trapped at Hells Canyon Dam, by month,
September 1984 through April 1985.

Month	No. trapped	Cumulative total	No. days trap operated
September	152	152	27
October	772	924	8
November	14	938	4
December	9	947	4
March	163	1,110	25
April	233	1,343	10

STEELHEAD EGG TAKING AND PRODUCTION

Spawning

Steelhead spawning began on April 2 and ended on May 13, 1985. Fish were sorted twice weekly. Ten spawning days resulted in 2,974,362 green eggs from 700 females (Table 2). An overall eye-up of 82.7% resulted in 2,458,870 eyed steelhead eggs.

Each spawning day began with taking milt from male steelhead and placing it in refrigerated storage. Milt from 12 males was pooled in each lot, taking care to obtain individual samples free of blood or urine before pooling. Females were then sorted and ripe individuals spawned. Ovarian fluids were drained from eggs using a colander and any bloody or overripe eggs discarded. Eggs from six females were placed in one bucket and dry-fertilized with pooled milt from 12 males. No saline solution or water was added, and fertilization rates were good. Fertilized eggs were rinsed and water hardened in a 1:150 Argentyne solution (67 ppm active iodine) for 30 minutes, then enumerated and placed in incubators.

Egg Shipments

The Niagara Springs Hatchery received 1,786,398 eyed eggs from Oxbow Hatchery (Table 2). The first lot of 204,049 eggs was too near hatching when shipped and died in transit, despite efforts to prevent the loss. (The eggs were shipped in chilled water topped with oxygen.) Thus, Niagara Springs actually received 1,582,349 viable eggs.

The Hagerman National Fish Hatchery (U.S. Fish and wildlife Service) also received 404,950 eyed eggs from Oxbow Hatchery.

Mortality and Disposition of Carcasses

Detected prespawning mortality accounted for 3% of all steelhead trapped (16 males and 25 females). Post-spawning mortality, i.e., green fish that died following sorting, accounted for 125 females. Post-spawning mortality data is not available for males as they were spawned more than once until they died in the pond.

The Desert Rose Fish Company received 210 salvageable carcasses for crayfish bait. The remaining carcasses were disposed of at the local land fill by the LaRue Sanitation Company, Halfway, Oregon. No carcasses were given to the public, as they all had been treated with MS-222 and were unfit for human consumption.

Table 2. Summary of egg taking, eye-up percentage, egg shipments, and fry production of steel head at Oxbow Hatchery during the 1985 egg production year.

Date	Lot	Green eqqs	Eyed eqqs	% eye-up	Shipped	Eyed eggs kept at Oxbow	No. fry at Oxbow	Eyed to fry % survival
4/2	1	304,965	225,674	74	204,049 ^a	21,625	4,834	22
4/8	2	585,583	456,755	78	359,319 ^a	97,436	82,705	85
4/10	3	770,315	613,800	80	413,600 ^a 200,200 ^b			
4/16	4	624,207	580,500	93	375,750 ^a 204,750 ^b			
4/19	5	205,200	218,400	106 ^c	218,400 ^a			
4/22	6	206,910	215,200	104 ^c	215,200 ^a			
4/25	7	136,182	68,091	50		68,091	26,180	38
4/29	8	36,000	21,600	60		21,600	16,088	76
5/6	9	65,000	31,850	49		31,850	16,854	53
5/13	10	40,000	27,000	66		27,000	18,600	69
Total		2,974,362	2,458,870	82.7	2,191,268	267,602	165,261	62

^aShipments to Niagara Springs Hatchery.

^bShipments to Hagerman National Fish Hatchery.

^cDue to negative bias during new method of green egg enumeration.

Fish Production and Release

A total of 267,602 eyed steelhead eggs were kept at Oxbow for fry production. Hatching survival was 62%, resulting in 165,261 swim-up fry. Rearing survival at the hatchery was 85%, producing 140,736 fry. These were planted at 1,869 fish/lb. into Hazard Creek, a tributary of the Little Salmon River.

The Niagara Springs Hatchery returned 330,520 fish to the Snake River on November 15, 1985. This fall stocking group averaged 25.5 fish/lb. for a total of 12,950 lbs. (Mowery, personal communication). The fish remaining at Niagara Springs were returned to the Snake River as presmolts from April 15 to May 5, 1986. These releases totaled 162,430 lbs. or 819,495 fish, for an average fish size of 5.0/lb.

FISH HEALTH

IDFG pathologist Harold Ramsey collected tissue and ovarian fluid samples from 60 adult steelhead during spawning. Fluorescent antibody tests for PKD and BKD were negative. Viral test results were negative for IHN and positive for IPN in 2 of 12 tissue pools.

During Incubation, steelhead eggs were given prophylactic treatments of formalin for fungus control. A 1:700 concentration for a 15-minute drip, applied every other day, was tried but found to be ineffective during green egg incubation. The concentration was increased to 1:500 until eggs were eyed and could be manually stirred and picked. The 1:700 concentration was then effective until hatch.

RESEARCH PROJECTS

A research study involving smallmouth bass (Micropterus dolomieu) was performed at Oxbow Hatchery during the summer of 1985. The objectives of the test were to achieve controlled raceway spawning of smallmouth, to collect and artificially incubate eggs or newly hatched fry and to feed train swim-up fry while testing a newly designed "Injector" type feeding system.

Twenty-three wild adult smallmouth bass were captured by electro-fishing in Oxbow Reservoir and placed in one concrete raceway containing partial barricades and nest boxes. Spawning was moderately successful with 5,000-7,000 eggs and fry recovered. Typical swim-up feeding behavior was observed with fry ingesting particles of the presented food. Difficulties in maintaining a constant rate of feed delivery were met with the use of an electric pan-type feeder.

Further difficulties arose from the use of Rangen's Salmon Starter diet. The diet, formulated for salmonids, was apparently not nutritionally adequate as a starter feed for centrarchids. Fry which

had started to feed experienced nearly 90% mortality. This problem was apparently solved by the addition of commercially available krill and freeze-dried copepods to the feed mixture.

This was a successful pilot study, although many problems were encountered. Details of the work may be found in an IDFG/IPC hatchery research report by Ed Schriever, titled "Smallmouth Bass Culture at Oxbow Hatchery: Feed Training Swim-up Fry."

HATCHERY IMPROVEMENTS AND MAINTENANCE

Hatchery Buildings

The shop/crew's quarter half of the hatchery building was remodeled, resulting in a larger shop and work area with a new work bench and two separate guest rooms. The office received new shelves for organization and storage of hatchery records and literature. The exterior and roof of the building was repainted, as were the interior walls and floor.

New PVC plumbing was installed in the incubator room, replacing the old, rusted iron plumbing. A gasoline-powered water pump was purchased as a back-up for the incubation water system. The pump attaches directly to the new overhead plumbing and can draw water from the outside raceways, which are kept full just in case of an emergency situation. New incubator trays were purchased and installed where needed.

A much-needed storage area was built on the east side of the hatchery building. Half of this addition is enclosed, insulated, and heated for chemical, paint, and equipment storage. The other half is open for screen and dam board storage.

Ponds and Equipment

The holding ponds were drained and thoroughly cleaned following salmon trapping. The pond crowders were sanded, brushed, sandblasted, and finally painted with rust-inhibitive paint.

New dam boards of 1 1/2-inch tongue-in-groove pine were installed in all positions of the holding pond series. The adult loading hopper was brought back into operation for the outloading of chinook that are to be hauled to Rapid River. It works well and greatly reduces loading stress.

Residence

IPC replaced the old mobile home with a newer 14 ft. x 60 ft., three-bedroom mobile unit. The newer home also received new carpeting, and the kitchen and bath were wallpapered. Central air conditioning was installed by IPC.

Hatchery personnel formed and poured a concrete patio in back, planted a lawn in top soil hauled to the site by IPC, and installed a chain link fence around the back yard. A two-bay carport with an 8 ft. x 20 ft. insulated storage room was built adjacent to the front of the residence. A new covered front porch and sidewalk were added.

Recommendations for Future Improvements

1. The adult loading hopper needs old lumber replaced, and the entire hopper and tower should be repainted to match the pond crowders.
2. The track for the center alley crowder needs repair as it hangs up during operation.
3. The center alley crowder drive motor needs rewiring with an additional control switch near the spawning tanks.
4. A silt settling system on the incubator water line would help reduce the silt build-up on eggs.
5. The large pump on the Pine Creek powerline does not deliver an acceptable quantity of water. It probably needs new impellers and possibly other repairs.

MISCELLANEOUS ACTIVITIES

An estimated 500 people visited the hatchery, including tours from the Halfway and Richland elementary schools. The hatchery is not well known, nor very easy to find.

Hatchery personnel participated in various other Department and outside activities, including local enforcement patrols with Conservation Officer Fred Edwards, deer feeding in Oregon with the local sportsmen group, assisting the Brownlee Bass Research Project, and helping during spawning at Rapid River Hatchery.

ACKNOWLEDGEMENTS

The Oxbow Hatchery experienced a considerable turnover of permanent personnel during the period of this report. Jim McLin was superintendent until he retired from the Department, and Ed Schriever was promoted to take his place on December 2, 1984. Ed was promoted after a year to Superintendent II at Cabinet Gorge Kokanee Hatchery. Doug Burton lateralled in on December 1, 1985.

Gene Merritt, of Halfway, Oregon, was the only temporary laborer employed during this- period. His talents as carpenter, craftsman, and general handyman made an important contribution.

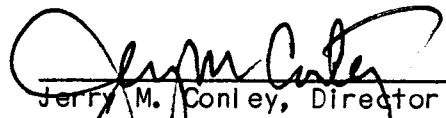
Special thanks go to Bio-Aides Jim Chandler and Larry Dunsmoor of the Brownlee Reservoir Project team. Although their duties did not involve the hatchery, they were willing to donate their free time, energy, and expertise whenever they could. Fullest appreciation is also expressed to Larry Wimer and the Idaho Power Company personnel whose mental and physical labors have been essential in the success of Oxbow Hatchery.

Submitted by:

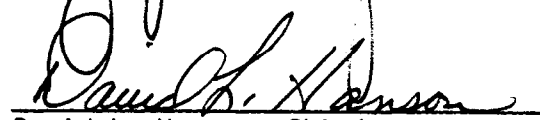
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